

What Is Claimed Is:

- 1 1. A lightweight fuel tank comprising:
2 an outer spherical shell member;
3 a second inner spherical shell member positioned inside said
4 outer shell member;
5 an inner shell member and said outer shell member being
6 positioned to provide an insulating radial gap between them;
7 said inner shell member having an outer surface and an inner
8 surface, said outer surface being coated with a low emissivity material; and
9 said outer shell member having an outer surface and an inner
10 surface, said inner surface being coated with a low emissivity material.
- 1 2. The light weight fuel tank as set forth in claim 1 further
2 comprising a first heating mechanism on said outer shell member for controlling
3 the rate of evaporation of hydrogen material contained in said inner shell
4 member.
- 1 3. The light weight fuel tank as set forth in claim 1
2 comprising a second heating mechanism on said outer surface of said outer shell
3 member for controlling icing of said fuel tank during use.
- 1 4. The light weight fuel tank as set forth in claim 1 wherein
2 said outer shell member is a sandwich construction employing low heat
3 conducting skin and core materials.
- 1 5. The light weight fuel tank as set forth in claim 1 wherein
2 said inner shell member is made of an aluminum material and said outer shell
3 member is made of a sandwich of titanium, Kevlar and Nomex materials.
- 1 6. The light weight fuel tank as set forth in claim 1 wherein
2 said low emissivity material is a flash of a copper material.

09963619-092501

1 7. The light weight fuel tank as set forth in claim 1 further
2 comprising a first port member in said outer shell member for evacuation of
3 said radial gap to a vacuum, and provide access for filling said inner shell
4 member with hydrogen material.

1 8. The light weight fuel tank as set forth in claim 1 further
2 comprising a second port member in said inner shell member for filling said
3 inner shell member with a hydrogen material, said second port member having a
4 valve mechanism.

1 9. The light weight fuel tank as set forth in claim 1 further
2 comprising a third port member in said inner shell member, said third port
3 member having a valve mechanism.

1 10. The light weight fuel tank as set forth in claim 1 wherein
2 said inner and outer shell members are connected at three locations, namely two
3 opposing equatorial external support positions and a port member.

1 11. The light weight fuel tank as set forth in claim 10
2 wherein said inner and outer shell members of different materials are connected
3 by a friction welded insert member.
4

add B²7

09963619-092501